

**1    CLAIMS**

2    What is claimed is:

3    1. A computer-implemented method for developing a reusable  
4    electronic circuit design module, wherein the design module  
5    is comprised of one or more functional design elements  
6    comprising the design module, comprising:

7         entering the functional design elements into a  
8    database;

9         entering documentation elements into the database;

10      linking the functional design elements with selected  
11    ones of the documentation elements;

12      simulating a testbench with the design module, whereby  
13    simulation results are generated;

14      storing the simulation results in the database; and

15      linking the simulation results with the functional  
16    design elements.

17

18    2. The method of claim 1, further comprising:

19         translating the functional design elements into a  
20    netlist; and

21         linking elements of the netlist with selected ones of  
22    the functional design elements.

23

24    3. The method of claim 2, further comprising:

25         translating the functional design elements into a  
26    physical implementation; and

27         linking elements of the physical implementation with  
28    selected ones of the functional design elements.

29

30    4. The method of claim 1, further comprising:

31         entering simulation elements in the database; and

32         linking the simulation elements to associated ones of  
33    the design elements.

34

35    5. The method of claim 4, further comprising:

1       entering documentation for a design script in the  
2 database; and  
3       linking the documentation of the design script to the  
4 design elements comprising the design module.

5

6       6. The method of claim 4, further comprising:  
7           entering documentation for the simulation elements in  
8 the database; and  
9           linking the documentation for the simulation elements  
10 with associated ones of the simulation elements.

11

12      7. The method of claim 6, further comprising:  
13           inspecting the functional design elements and  
14 simulation elements for associated documentation; and  
15           reporting documentation deficiencies in association  
16 with the functional design elements and simulation design  
17 elements.

18

19      8. The method of claim 1, further comprising:  
20           inspecting the functional design elements for  
21 associated documentation; and  
22           reporting documentation deficiencies in association  
23 with the functional design elements.

24

25      9. The method of claim 1, further comprising:  
26           inspecting the functional design elements for  
27 undesirable design characteristics; and  
28           reporting the undesirable design characteristics found  
29 in the functional design elements.

30

31     10. The method of claim 9, further comprising:  
32           inspecting the functional design elements for  
33 undesirable hierarchical characteristics; and  
34           reporting discovered ones of the undesirable  
35 hierarchical characteristics.

36

- 1       11. The method of claim 9, further comprising:  
2                 inspecting the functional design elements for adherence  
3         to predefined design rules; and  
4                 reporting violations of the design rules.  
5  
6       12. The method of claim 11, further comprising providing  
7         assistance in specifying the design rules for the functional  
8         design elements.  
9  
10      13. The method of claim 9, further comprising:  
11                 monitoring changes made to the functional design  
12         elements; and  
13                 indicating which of the functional design elements are  
14         dependent on the changes.  
15  
16      14. The method of claim 1, further comprising:  
17                 translating the functional design elements into a  
18         physical implementation; and  
19                 linking elements of the physical implementation with  
20         selected ones of the functional design elements.  
21  
22      15. The method of claim 1, further comprising requiring  
23         specification of parameters at a top level of a hierarchy of  
24         the design module.  
25  
26      16. The method of claim 1, further comprising displaying  
27         the functional design elements linked to errors in the  
28         simulation results.  
29  
30      17. The method of claim 16, further comprising displaying  
31         documentation elements associated with errors in the  
32         simulation results.  
33  
34      18. An apparatus for developing a reusable electronic  
35         circuit design module, wherein the design module is

1 comprised of one or more functional design elements  
2 comprising the design module, comprising:  
3       means for entering the functional design elements into  
4       a database;  
5       means for entering documentation elements into the  
6       database;  
7       means for linking the functional design elements with  
8       selected ones of the documentation elements;  
9       means for simulating a testbench with the design  
10      module, whereby simulation results are generated;  
11       means for storing the simulation results in the  
12      database; and  
13       means for linking the simulation results with the  
14      functional design elements.

15

16 19. A system for developing a reusable electronic circuit  
17 design module, wherein the design module is comprised of one  
18 or more functional design elements comprising the design  
19 module, comprising:  
20       a database arranged for storage of the design elements  
21 and documentation elements;  
22       a design inspector coupled to the database, the design  
23 inspector configured and arranged to link the functional  
24 design elements with selected ones of the documentation  
25 elements;  
26       a debugging-support module coupled to the simulator and  
27 to the database, the debugging-support module configured and  
28 arranged to generate a netlist from the design module,  
29 wherein the netlist is suitable for simulation;  
30       a functional simulator coupled to the debugging-support  
31 module, the simulator configured and arranged to simulate a  
32 testbench with the design module, whereby simulation results  
33 are generated; and  
34       wherein the debugging-support module is further  
35 configured and arranged to store the simulation results in

- 1 the database and link the simulation results with the
- 2 functional design elements.

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